
Platelet-derived growth factor receptor beta is critical for zebrafish intersegmental vessel formation.

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Public Summary:

Scientific Abstract:

BACKGROUND: Platelet-derived growth factor receptor beta (PDGFRbeta) is a tyrosine kinase receptor known to affect vascular development. The zebrafish is an excellent model to study specific regulators of vascular development, yet the role of PDGF signaling has not been determined in early zebrafish embryos. Furthermore, vascular mural cells, in which PDGFRbeta functions cell autonomously in other systems, have not been identified in zebrafish embryos younger than 72 hours post fertilization.

METHODOLOGY/PRINCIPAL FINDINGS: In order to investigate the role of PDGFRbeta in zebrafish vascular development, we cloned the highly conserved zebrafish homolog of PDGFRbeta. We found that pdgfrbeta is expressed in the hypochord, a developmental structure that is immediately dorsal to the dorsal aorta and potentially regulates blood vessel development in the zebrafish. Using a PDGFR tyrosine kinase inhibitor, a morpholino oligonucleotide specific to PDGFRbeta, and a dominant negative PDGFRbeta transgenic line, we found that PDGFRbeta is necessary for angiogenesis of the intersegmental vessels. **SIGNIFICANCE/CONCLUSION:** Our data provide the first evidence that PDGFRbeta signaling is required for zebrafish angiogenesis. We propose a novel mechanism for zebrafish PDGFRbeta signaling that regulates vascular angiogenesis in the absence of mural cells.

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